

WHAT IS CLAIMED IS:

- 1 1. In a system having a plurality of nodes including a plurality of connection control
2 nodes having broadband switching fabric and at least one call control node having switching
3 intelligence and narrowband switching fabric, said plurality of connection control nodes being
4 controlled by said at least one call control node, a select one of said nodes comprising:
5 a data structure containing bandwidth data identifying an amount of available
6 bandwidth on at least one of a plurality of paths, each of said plurality of paths being between two
7 of said plurality of connection control nodes; and
8 means for selecting at least one of said paths for switching an incoming call through
9 a broadband network interconnecting said plurality of connection control nodes using said bandwidth
10 data.
- 1 2. The node of Claim 1, wherein said at least one call control node is a Media Gateway
2 Controller and said plurality of connection control nodes are Media Gateways.
- 1 3. The node of Claim 2, wherein said select node is said Media Gateway Controller.
- 1 4. The node of Claim 2, wherein said select node is a select one of said Media Gateways.

1 5. The node of Claim 1, wherein said data structure comprises a plurality of records, each
2 of said paths being associated with a respective one of said plurality of records.

1 6. The node of Claim 1, wherein said data structure further comprises statistical
2 information related to said bandwidth data on each of said paths.

1 7. The node of Claim 1, further comprising:
2 means for performing a calculation of said statistical information related to said
3 bandwidth data on each of said paths, said calculation being performed continuously or periodically;
4 and
5 means for storing said statistical information in said data structure.

1 8. The node of Claim 7, further comprising:
2 means for generating a report identifying congestion conditions in said broadband
3 network using at least one of said bandwidth data and said statistical information.

1 9. The node of Claim 1, further comprising:

2 means for allocating bandwidth on said at least one selected path for said incoming
3 call; and

4 means for updating said bandwidth data within said data structure for said at least one
5 selected path based on said bandwidth allocated for said incoming call.

1 10. The node of Claim 1, wherein said means for selecting further comprises:

2 means for receiving a maximum bandwidth amount for said incoming call;

3 means for determining a list of routes from said plurality of paths for said incoming
4 call, each of said routes including at least one of said paths; and

5 means for selecting an optimum route from said list of routes based on said maximum
6 bandwidth amount and said bandwidth data for each of said paths associated with each of said routes
7 on said list of routes, said amount of available bandwidth on each of said paths associated with said
8 optimum route being greater than said maximum bandwidth amount for said call.

1 11. The node of Claim 10, wherein said list of routes includes a primary route and a
2 secondary route, and wherein said means for selecting further comprises:

3 means for selecting said primary route when said amount of available bandwidth on
4 each of said paths associated with said primary route is greater than said maximum bandwidth
5 amount; and

6 means for selecting said secondary route when said amount of available bandwidth on
7 any of said paths associated with said primary route is less than said maximum bandwidth amount and
8 said amount of available bandwidth on each of said paths associated with said secondary route is
9 greater than said maximum bandwidth amount.

1 12. The node of Claim 10, wherein said amount of available bandwidth on at least one of
2 said paths associated with said optimum route is greater than said amount of available bandwidth on
3 any of said paths associated with other ones of said routes in said list of routes.

1 13. The node of Claim 1, wherein said data structure further includes quality data related
2 to the quality of packet transmissions on at least one of said plurality of paths within said broadband
3 network.

1 14. The node of Claim 13, wherein each of said connection control nodes has a jitter
2 buffer therein for buffering packets received through said broadband network, said quality data being
3 based on measurements related to said jitter buffer.

1 15. The node of Claim 14, wherein said measurements include at least one of a jitter buffer
2 underflow measurement and a jitter buffer overflow measurement.

1 16. The node of Claim 14, wherein said quality data includes an indication of the number
2 of bad quality calls along each of said plurality of paths, said measurements being used to determine
3 whether a particular call is a bad quality call.

1 17. The node of Claim 13, wherein said means for selecting further comprises:
2 means for determining a list of routes from said plurality of paths for said incoming
3 call, each of said routes including at least one of said paths; and
4 means for selecting an optimum route from said list of routes based on said quality
5 data and said bandwidth data for each of said paths associated with each of said routes on said list
6 of routes.

1 18. The node of Claim 17, wherein said quality data on at least one of said paths
2 associated with said optimum route indicates that the quality of packet transmissions on said optimum
3 route is greater than the quality of packet transmissions on any other ones of said routes in said list
4 of routes.

1 19. The node of Claim 17, wherein said quality data on at least one of said paths
2 associated with said optimum route indicates that the quality of packet transmissions on said optimum
3 route meets a minimum quality standard.

1 20. The node of Claim 13, further comprising:
2 means for updating said quality data for each of said plurality of paths during said
3 incoming call; and
4 means for selecting at least one alternative path for said incoming call based on said
5 updated quality data and said bandwidth data.

1 21. The node of Claim 20, wherein said means for selecting said at least one alternative
2 path further comprises:

3 means for selecting said at least one alternative path for said incoming call when said
4 updated quality data for said at least one selected path indicates the quality of packet transmissions
5 on said at least one selected path does not meet minimum quality standards and said updated quality
6 data for said at least one alternative path indicates the quality of packet transmissions on said at least
7 one selected path does meet minimum quality standards; and

8 means for terminating said incoming call when said updated quality data for said at
9 least one selected path and said at least one alternative path indicates the quality of packet
10 transmissions on said at least one selected path and said at least one alternative path does not meet
11 minimum quality standards.

1 22. The node of Claim 13, wherein said data structure further comprises statistical
2 information related to said quality data for each of said paths.

1 23. The node of Claim 22, further comprising:

2 means for performing a calculation of said statistical information related to said quality
3 data for each of said paths, said calculation being performed continuously or periodically; and

4 means for storing said statistical information in said data structure.

1 24. The node of Claim 23, further comprising:
2 means for generating a report identifying congestion conditions in said broadband
3 network using at least one of said quality data and said statistical information.

1 25. A server for monitoring bandwidth allocation in a broadband network having a
2 plurality of nodes including a plurality of connection control nodes having broadband switching fabric
3 and at least one call control node having switching intelligence and narrowband switching fabric, said
4 plurality of connection control nodes being controlled by said at least one call control node, said
5 plurality of connection control nodes being interconnected by a plurality of paths, said server
6 comprising:

7 means for receiving quality data related to the quality of packet transmissions on at
8 least one of said plurality of paths within said broadband network;

9 means for performing a calculation of statistical information related to said quality data
10 for each of said paths, said calculation being performed continuously or periodically; and

11 means for storing said statistical information in a database therein.

1 26. The server of Claim 25, further comprising:
2 means for generating a report identifying congestion conditions in said broadband
3 network using at least one of said quality data and said statistical information.

1 27. The server of Claim 25, wherein each of said connection control nodes has a jitter
2 buffer therein for buffering packets received through said broadband network, said quality data being
3 based on measurements relate to said jitter buffer.

1 28. The server of Claim 27, wherein said measurements include at least one of a jitter
2 buffer underflow measurement and a jitter buffer overflow measurement.

1 29. A method for allocating bandwidth in a broadband network having a plurality of
2 connection control nodes having broadband switching fabric and at least one call control node having
3 switching intelligence and narrowband switching fabric, said plurality of connection control nodes
4 being controlled by said at least one call control node, said plurality of connection control nodes being
5 interconnected by a plurality of paths, said method comprising the steps of:

6 maintaining bandwidth data identifying an amount of available bandwidth on at least
7 one of a plurality of paths; and

8 selecting at least one of said paths for switching an incoming call through said
9 broadband network using said bandwidth data.

1 30. The method of Claim 29, wherein said step of maintaining further comprises the step
2 of:
3 maintaining a data structure comprising a plurality of records, each of said paths being
4 associated with a respective one of said plurality of records; and
5 storing said bandwidth data for each of said plurality of paths in a respective one of
6 said plurality of records within said data structure.

1 31. The method of Claim 30, further comprising the steps of:
2 performing a calculation of statistical information related to said bandwidth data on
3 each of said paths, said calculation being performed continuously or periodically; and
4 storing said statistical information in said data structure.

1 32. The method of Claim 31, further comprising the step of:
2 generating a report identifying congestion conditions in said broadband network using
3 at least one of said bandwidth data and said statistical information.

1 33. The method of Claim 29, further comprising the steps of:
2 allocating bandwidth on said at least one selected path for said incoming call; and
3 updating said bandwidth data for said at least one selected path based on said
4 bandwidth allocated for said incoming call.

1 34. The method of Claim 29, wherein said step of selecting further comprises the steps
2 of:
3 receiving a maximum bandwidth amount for said incoming call;
4 determining a list of routes from said plurality of paths for said incoming call, each of
5 said routes including at least one of said paths; and
6 selecting an optimum route from said list of routes based on said maximum bandwidth
7 amount and said bandwidth data for each of said paths associated with each of said routes on said list
8 of routes, said amount of available bandwidth on each of said paths associated with said optimum
9 route being greater than said maximum bandwidth amount for said call.

1 35. The method of Claim 34, wherein said list of routes includes a primary route and a
2 secondary route, and wherein said step of selecting further comprises the steps of:

3 selecting said primary route when said amount of available bandwidth on each of said
4 paths associated with said primary route is greater than said maximum bandwidth amount; and

5 selecting said secondary route when said amount of available bandwidth on any of said
6 paths associated with said primary route is less than said maximum bandwidth amount and said
7 amount of available bandwidth on each of said paths associated with said secondary route is greater
8 than said maximum bandwidth amount.

1 36. The method of Claim 34, wherein said step of selecting said optimum route further
2 comprises the step of:

3 determining said amount of available bandwidth on at least one of said paths
4 associated with said optimum route is greater than said amount of available bandwidth on any of said
5 paths associated with other ones of said routes in said list of routes.

1 37. A method for allocating bandwidth in a broadband network having a plurality of
2 connection control nodes having broadband switching fabric and at least one call control node having
3 switching intelligence and narrowband switching fabric, said plurality of connection control nodes
4 being controlled by said at least one call control node, said plurality of connection control nodes being
5 interconnected by a plurality of paths, said method comprising the steps of:

6 maintaining bandwidth data identifying an amount of available bandwidth on at least
7 one of a plurality of paths;

8 maintaining quality data related to the quality of packet transmissions on said at least
9 one path; and

10 selecting at least one of said paths for switching an incoming call through said
11 broadband network using said bandwidth data and said quality data.

1 38. The method of Claim 37, wherein each of said connection control nodes has a jitter
2 buffer therein for buffering packets received through said broadband network, and wherein said step
3 of maintaining further comprises the step of:

4 collecting said quality data based on measurements related to said jitter buffer.

1 39. The method of Claim 38, wherein said step of collecting further comprises the steps
2 of:
3 determining whether a particular one of a plurality of calls is a bad quality call using
4 said measurements;
5 aggregating said measurements for said plurality of calls; and
6 providing said quality data including an indication of the number of bad quality calls
7 along each of said plurality of paths.

1 40. The method of Claim 37, wherein said step of selecting further comprises the steps
2 of:
3 determining a list of routes from said plurality of paths for said incoming call, each of
4 said routes including at least one of said paths; and
5 selecting an optimum route from said list of routes based on said quality data and said
6 bandwidth data for each of said paths associated with each of said routes on said list of routes.

1 41. The method of Claim 40, wherein said step of selecting said optimum route further
2 comprises the step of:

3 determining said quality data on at least one of said paths associated with said
4 optimum route indicates that the quality of packet transmissions on said optimum route is greater than
5 the quality of packet transmissions on any other ones of said routes in said list of routes.

1 42. The method of Claim 40, wherein said step of selecting said optimum route further
2 comprises the step of:

3 determining said quality data on at least one of said paths associated with said
4 optimum route indicates that the quality of packet transmissions on said optimum route meets a
5 minimum quality standard.

1 43. The method of Claim 37, further comprising the step of:
2 performing a calculation of statistical information related to at least said quality data
3 for each of said paths, said calculation being performed continuously or periodically; and
4 maintaining said statistical information.

1 44. The method of Claim 43, further comprising the step of:
2 generating a report identifying congestion conditions in said broadband network using
3 at least one of said quality data and said statistical information.

1 45. A method for allocating bandwidth in a broadband network having a plurality of
2 connection control nodes having broadband switching fabric and at least one call control node having
3 switching intelligence and narrowband switching fabric, said plurality of connection control nodes
4 being controlled by said at least one call control node, said plurality of connection control nodes being
5 interconnected by a plurality of paths, said method comprising the steps of:

6 maintaining bandwidth data identifying an amount of available bandwidth on at least
7 one of a plurality of paths;

8 maintaining quality data related to the quality of packet transmissions on said at least
9 one path;

10 selecting at least one of said paths for switching an incoming call through said
11 broadband network using said bandwidth data and said quality data;

12 updating said quality data for each of said plurality of paths during said incoming call;

13 and

14 selecting at least one alternative path for said incoming call based on said updated
15 quality data and said bandwidth data.

1 46. The method of Claim 45, wherein said step of selecting said at least one alternative
2 path further comprises the steps of:

3 selecting said at least one alternative path for said incoming call when said updated
4 quality data for said at least one selected path indicates the quality of packet transmissions on said
5 at least one selected path does not meet minimum quality standards and said updated quality data for
6 said at least one alternative path indicates the quality of packet transmissions on said at least one
7 selected path does meet minimum quality standards; and

8 terminating said incoming call when said updated quality data for said at least one
9 selected path and said at least one alternative path indicates the quality of packet transmissions on
10 said at least one selected path and said at least one alternative path does not meet minimum quality
11 standards.